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are extremely beautiful. The Goldiana is superb, and is by many persons considered our finest New England species. It is most effectively used as an individual plant. *Dryopteris intermedia* because of its exquisite fine-cut evergreen foliage and its endless variation is particularly attractive, and a good-sized garden could be devoted to this one species to advantage.

The hybrids, *D. cristata* \times *intermedia* and *D. cristata* \times *marginalis* are both good garden ferns. I have a dozen clumps of the first-named, and they are so thrifty and vigorous that they always attract much attention.

NEWBURYPORT, MASS.

(To be continued.)

More Interesting Fern Localities.

Mr. Winslow's article on Willoughby Lake as the richest fern locality has served to set those of us who live in north-central Connecticut counting our species. The results show that we cannot surpass the Vermont lists in number of species and do not possess anything quite so rare as the Hart's-tongue at Green Lake, but that we have a region with a diversified fern flora and different in many of its conditions from any of those treated by Mr. Winslow. So, rather by way of comparison than competition we are moved to say something of our own treasure-spots for ferns.

The central lowland of Connecticut comprises the valley of the Connecticut River north of Middletown and those of the Farmington and Quinnipiac west of it. The underlying rock throughout is a red sandstone of Triassic age. According to the geologists, it was, at three different times during the period of its deposition, broken by lateral pressure. Through the openings thus made, molten lava (trap rock) was forced up from below and spread out into great sheets, at first horizon-

tal, later tilted in a northwest-southeast direction by the great Adirondack mountain-making movement. The softer rock around them has been worn away by erosion and their uplifted edges now form a long ridge, running north and south which usually slopes gradually on the east side and is very abrupt on the west. Over one of the sheets is, or was, a thin vein of impure limestone. From this and the decomposition of the trap itself sufficient calcium salts are furnished to the soil to support, in favored spots, such lime-requiring species as the wall-rue spleenwort and the purple cliff-brake. On the floor of the lowland the underlying rocks are nearly everywhere buried deep under glacial deposits of clay, gravel and sand. The sandy areas, with their attendant swamps, furnish congenial habitats for coastal plain and other species of acid soils.

Fern lists have been sent in to the JOURNAL from three localities lying along the trap ridge on a line of about 25 miles. The first, from Mr. Irving Holcomb, contains, reckoned on the basis used by Mr. Winslow, 34 species. It covers the entire town of Granby, some 40 square miles; but most, if not all, of the species, could probably be found within a much smaller area. Mr. H. C. Bigelow reports 31 species from a triangle a mile at base and extending out two miles on the west slope of the ridge in the town of Plainville. But perhaps the most remarkable list for this region, because of the very small area it covers, is that sent in by Dr. E. H. Munger.¹ At one point, also on the west slope of the ridge, in the town of Avon, there is a hollow in which water settles, forming a small swamp. This is drained by a stream which flows for a short distance under ground and finally finds its way to the valley through a water-worn cleft in the lower wall of the hollow. Here, on cliff and in swamp and ravine, within

¹ Dr. Munger has also furnished most of the geological information given above.

a triangle with a base of three-quarters of a mile and sides of five-eighths, are found 30 species of ferns.

Of the 27 species listed by Mr. Winslow as common to all his localities, 22 are also in the Connecticut lists. Two, *Cryptogramma Stelleri* and *Cystopteris bulbifera*, are not in any of them, though the latter occurs at three stations between Dr. Munger's and Mr. Holcomb's areas. Only Mr. Holcomb reports *Phegopteris Dryopteris* and *Asplenium Ruta-muraria*, the latter the rarest fern of this region, but he lacks *Dryopteris Goldiana* which the other two have. All the Connecticut lists have *Phegopteris hexagonoptera*, *Pellaea atropurpurea*, *Woodwardia virginica*, *Asplenium platyneuron*, *Woodsia ilvensis* and *W. obtusa*. Two have *Dryopteris simulata*, two *Lygodium palmatum*. Dr. Munger alone has *Athyrium angustifolium*, Mr. Holcomb alone *Phegopteris polypodioides*, and Mr. Bigelow is the sole finder of *Woodwardia areolata*.

Taken together, the Connecticut lists show 36 species, four less than the total given by Mr. Winslow. *Cystopteris bulbifera*, found within two miles of the Granby town line, brings the total for the region to 37. It lacks, naturally, the northern species found in the Vermont and New York localities, but has the four southern ones absent there. It lacks such specialities as *Scolopendrium* and *Woodsia alpina*, but has one of its own in *Lygodium*. And (if hybrids may be mentioned, even if they do not count) Mr. Bigelow has found 15 plants of *Asplenium ebenoides*.

As to Ophioglossaceae, Dr. Munger has yet to find Ophioglossum; otherwise we have all the Gray's Manual species of this family except *Botrychium Lunaria*.

THE DORSET FERN LIST AGAIN.—A friend has brought to my attention a note which I had overlooked in pre-